

# A High Performance System With Explicit Incorporation of ATC Regulations to Generate Contingency Plans for UAVs with Lost Communication, Phase I

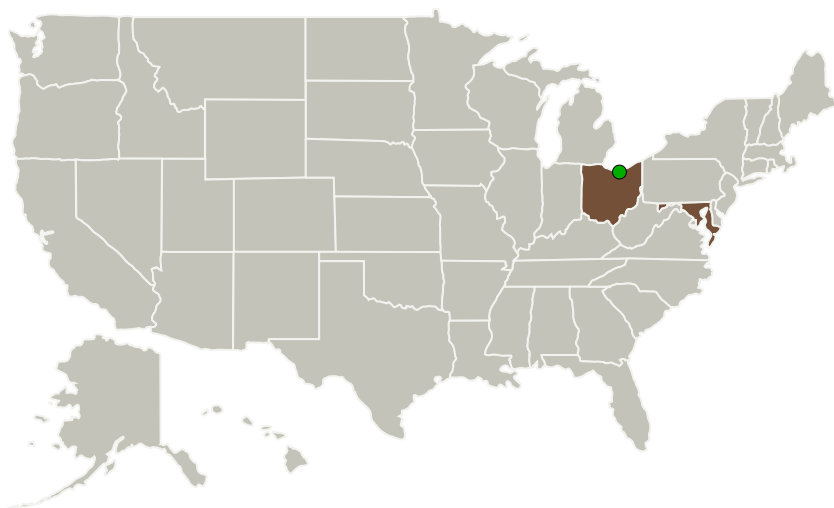
Completed Technology Project (2013 - 2013)



## Project Introduction

We propose a comprehensive and systematic contingency plan generation framework to deal with lost communication in UAVs. ATC regulations are explicitly incorporated into our system. Our proposed framework was motivated by our recent work for the Naval Air Station at Patuxent River. It should be noted that our earlier framework was very general, as we have designed a system which can deal with many types of pop-up threats such as enemy attacks, internal system faults, external interferences, etc. Currently, we have been focusing on generating contingency plans for engine out problems for the Navy. In this NASA Phase 1, we will focus on generating contingency plans for lost communication. Our proposed approach has one key component known as Risk Management Plan (RMP), which assesses mission risk of a given air task order (ATO) and provides solutions for known or unknown threats throughout the course of the mission. Four sub-plans are used to support RMP: Situation Analysis (SA), Preparedness & Prevention Plan (PPP), Incident Response Plan (IRP), and Rescue & Recovery Plan (RRP). We propose to apply case based reasoning (CBR) in two modules (PPP and IRP) to generate contingency flight paths, contingency points, safe points, and incident response rules. In CBR, we can easily incorporate ATC regulations, which can be formulated as used cases in the CBR.

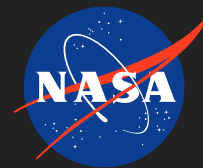
## Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Signal Processing, Inc.	Lead Organization	Industry Minority-Owned Business, Small Disadvantaged Business (SDB), Women-Owned Small Business (WOSB)	Rockville, Maryland
● Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

## Primary U.S. Work Locations

Maryland	Ohio
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## Project Transitions

▶ **May 2013:** Project Start

✓ **November 2013:** Closed out

### Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/137820>)

## Organizational Responsibility

### Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

### Lead Organization:

Signal Processing, Inc.

### Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

## Project Management

### Program Director:

Jason L Kessler

### Program Manager:

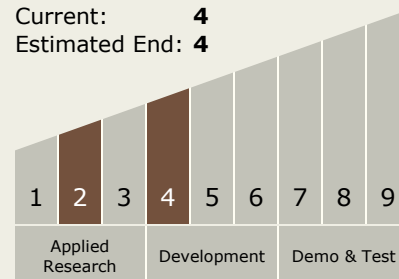
Carlos Torrez

### Principal Investigator:

Chiman Kwan

## Technology Maturity (TRL)

Start: 2  
Current: 4  
Estimated End: 4



Completed Technology Project (2013 - 2013)

# MISSING DRONE!



REWARD for finding Drone, PhD Candidate  
born 1-15-2012 Chained near 17th and Franklin AVE.  
9 Forest Cct. 200 - 448-0071 Remission

# A High Performance System With Explicit Incorporation of ATC Regulations to Generate Contingency Plans for UAVs with Lost Communication

(<https://techport.nasa.gov/image/132205>)

**Primary:**

- TX16 Air Traffic Management and Range Tracking Systems
  - └ TX16.3 Traffic Management Concepts

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System